

## NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

### DIVERSION

(Ft)

CODE 362

#### DEFINITION

A channel constructed across the slope with a supporting ridge on the lower side.

#### SCOPE

This standard applies to the installation of all diversions except floodwater diversions (400) and diversion dams (348).

#### PURPOSE

To divert excess water from one area for use or safe disposal in other areas.

#### CONDITIONS WHERE PRACTICE APPLIES

This practice applies to sites where:

1. Runoff damages cropland, pastureland, farmsteads, feedlots, or conservation practices such as terraces or stripcropping.
2. Surface flow and shallow subsurface flow caused by seepage are damaging sloping upland.
3. Runoff is in excess and available for use on nearby sites.
4. A diversion is required as part of a pollution abatement system.
5. A diversion is required to control erosion and runoff on urban or developing areas and construction or mining sites.

#### DESIGN CRITERIA

**Capacity.** Diversions as temporary measures, with a life span of less than 2 years, shall carry as a minimum the 2-year, 24 hour-duration storm. Diversions that protect agricultural land and those that are part of a pollution abatement system must have the capacity to carry the peak runoff from a 10-year-frequency, 24-hour-duration storm as a minimum.

Diversions designed to protect areas such as urban areas, buildings, and roads, shall have enough capacity to carry the peak runoff expected from a storm frequency consistent with the hazard involved but not less than a 25-year-frequency, 24-hour-duration storm with a freeboard not less than 0.3 ft.

**Cross section.** The channel may be parabolic, V-shaped, or trapezoidal. The diversion shall be designed to have stable side slopes. The ridge height shall include an adequate settlement factor. The ridge shall have a minimum top width of 4 ft at the design elevation. The minimum cross section shall meet the specified dimensions. The top of the constructed ridge shall not be lower at any point than the design elevation plus the specified overfill for settlement.

**Grade and velocity.** Channel grades may be uniform or variable. Channel velocity shall not exceed that considered nonerosive for the soil and planned vegetation or lining.

**Location.** The location of the diversion shall be determined by outlet conditions, topography, land use, cultural operations, and soil type. A diversion in a cultivated field must be aligned to permit use of modern farming equipment.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resource Conservation Service.

**NRCS, ALASKA**  
**June, 2001**

**Protection against sedimentation.**

Diversions should not be used below high-sediment-producing areas unless land treatment practices or structural measures, designed to prevent damaging accumulations of sediment in the channels, are installed with or before the diversions. If movement of sediment into the channel is a significant problem, a vegetated filter strip shall be used where soil or climate does not preclude its use. Then, the design shall include extra capacity for sediment and be supported by supplemental structures, cultural or tillage practices, or special maintenance measures.

**Outlets.** Each diversion must have a safe and stable outlet with adequate capacity. The outlet may be a grassed waterway, a vegetated or paved area, a grade stabilization structure, an underground outlet, a stable watercourse, or a combination of these practices. The outlet must convey runoff to a point where outflow will not cause damage. Vegetative outlets shall be installed before diversion construction to insure establishment of vegetative cover in the outlet channel. Underground outlets consist of an inlet and underground conduit. The release rate when combined with storage is to be such that the design storm will not overtop the diversion ridge. On large watersheds, runoff flows are usually too large to outlet entirely through underground outlets.

The design elevation of the water surface in the diversion shall not be lower than the design elevation of the water surface in the outlet at their junction when both are operating at design flow.

**Vegetation.** Disturbed areas that are not to be cultivated shall be established to grass as soon as practicable after construction. If the soils or

climatic conditions preclude the use of vegetation for erosion protection, nonvegetative linings such as gravel, rock riprap, or cellular block may be used. Seedbed preparation, seeding, fertilizing, and mulching shall comply with standards in local technical guides. The vegetation shall be maintained and trees and shrubs controlled by hand, machine, or chemicals.

**OPERATION AND MAINTENANCE**

A maintenance program shall be established to maintain diversion capacity, storage, ridge height, and the outlets. Maintenance needs are to be discussed with the landowner or operator who is responsible for maintaining the practices installed with SCS assistance. Diversion ridges can be hazardous for farming operations or mowing. Any hazards must be brought to the attention of the responsible person.

**PLANS AND SPECIFICATIONS**

Plans and specifications for installing diversions shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Refer to NRCS Alaska Construction and Material Specifications to select the appropriate specification for a specific project. Applicable NRCS National Engineering Handbook, Section 20 (NEH-20) Construction and Materials Specifications may be used in place of NRCS Alaska Construction and Materials Specifications.

## **DIVERSION SPECIFICATIONS**

### **362**

All ditches or gullies not filled, and undesirable trees and other obstructions not removed before construction begins shall be part of the diversion construction. The diversion shall be constructed to planned alignment, grade, and cross section.

If underground conduits are located under diversion ridges, mechanical compaction or water packing should be required. Installation and backfill of conduit trenches shall be made in advance to allow adequate settlement. The materials used for the inlet and conduit shall be suitable for the purpose intended and shall meet the requirements for subsurface drains (606). Diversion ridges constructed across gullies or depressions shall be compacted sufficiently to keep settlement within tolerable limits.

The surface of the finished diversion shall be reasonably smooth and present a workmanlike appearance.

Topsoil should be stockpiled and spread over excavations and other areas to facilitate revegetation. If vegetation is needed, seedbed preparation, seeding, fertilizing, and mulching shall comply with standards in local technical guides.

## **PLANNING CONSIDERATIONS FOR WATER QUANTITY AND QUALITY**

### ***Quantity***

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation and ground water recharge.
2. The type of outlet, time of water detention, geology, and topography of the site.

### ***Quality***

1. Effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances carried by runoff.
2. Effects of nutrients and pesticides on surface and ground water quality.
3. Filtering effects of vegetation on movement of sediment and dissolved and sediment-attached substances.
4. Short-term and construction-related effects on the quality of downstream water.
5. Effects on the movement of dissolved substances below the root zone and toward the ground water
6. Potential for uncovering or redistributing toxic materials and low productive soils that might cause undesirable effects on the water or plants